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PATENT & TRADEMARK OFFICE

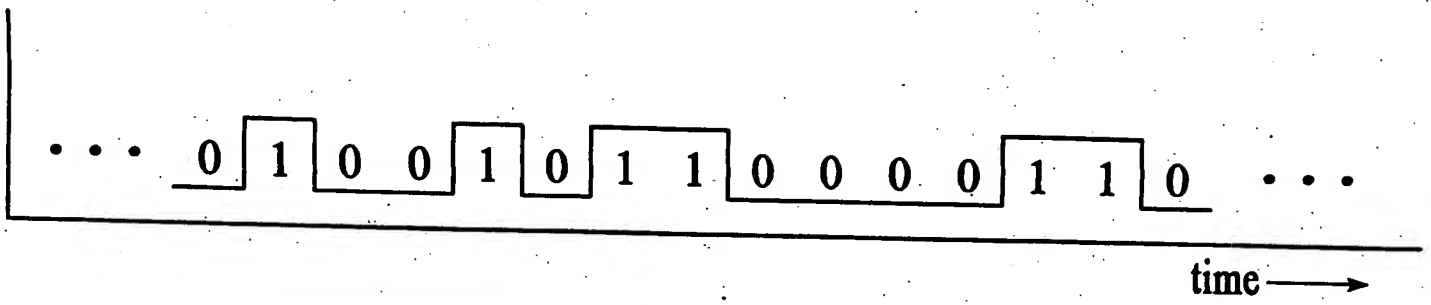


FIG. 1 (PRIOR ART)

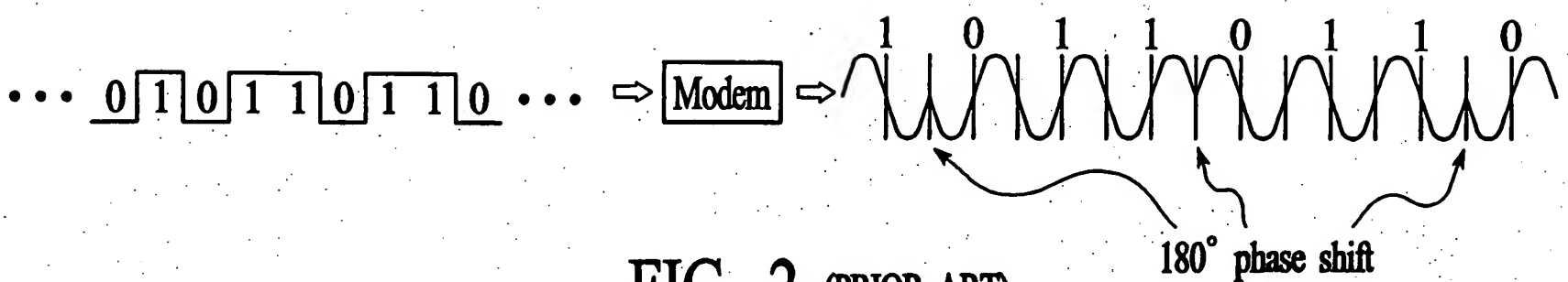


FIG. 2 (PRIOR ART)

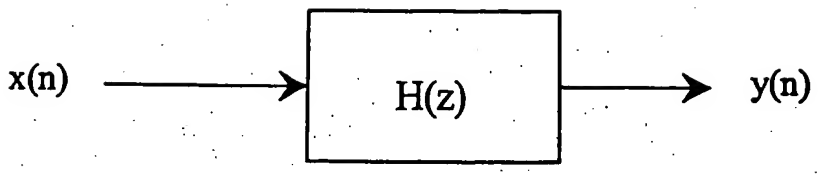


FIG. 3

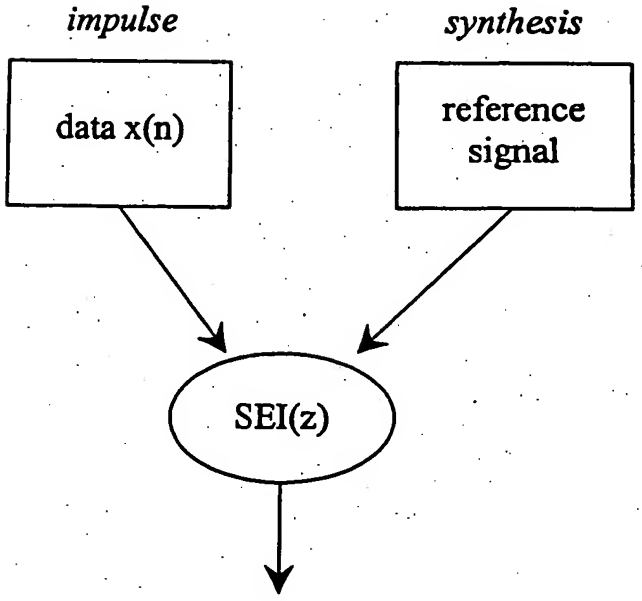
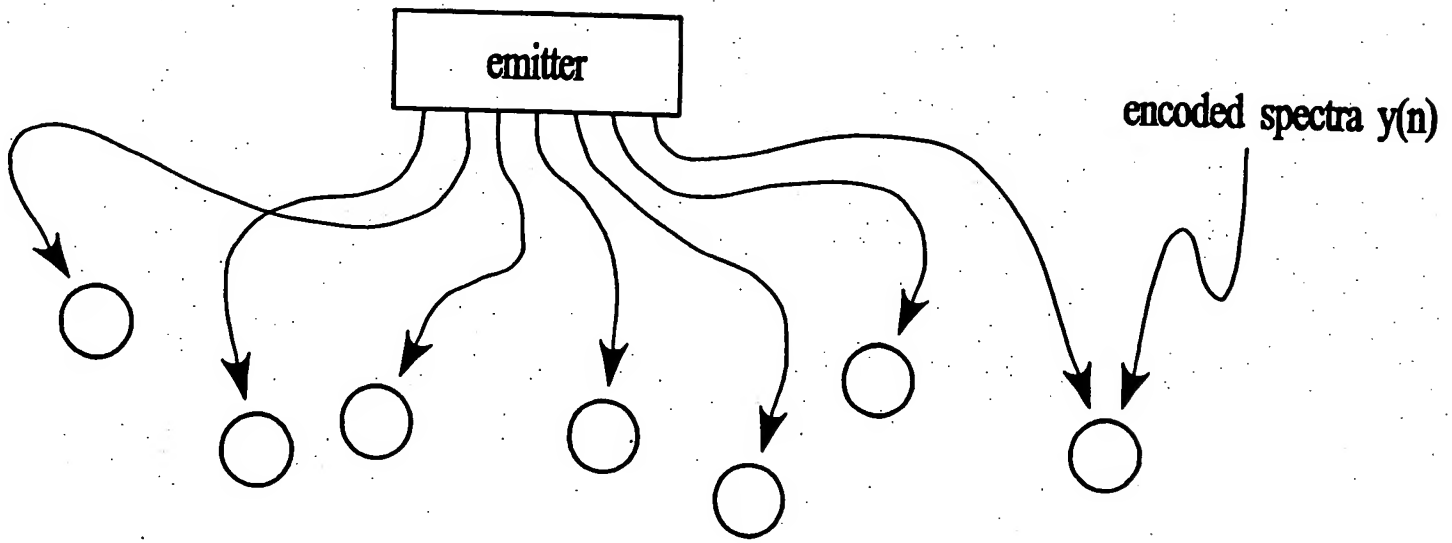


FIG. 4



A more detailed view of an SEI system. Encoded spectra are emitted over time, flowing forward in this direction ⟶

FIG. 5

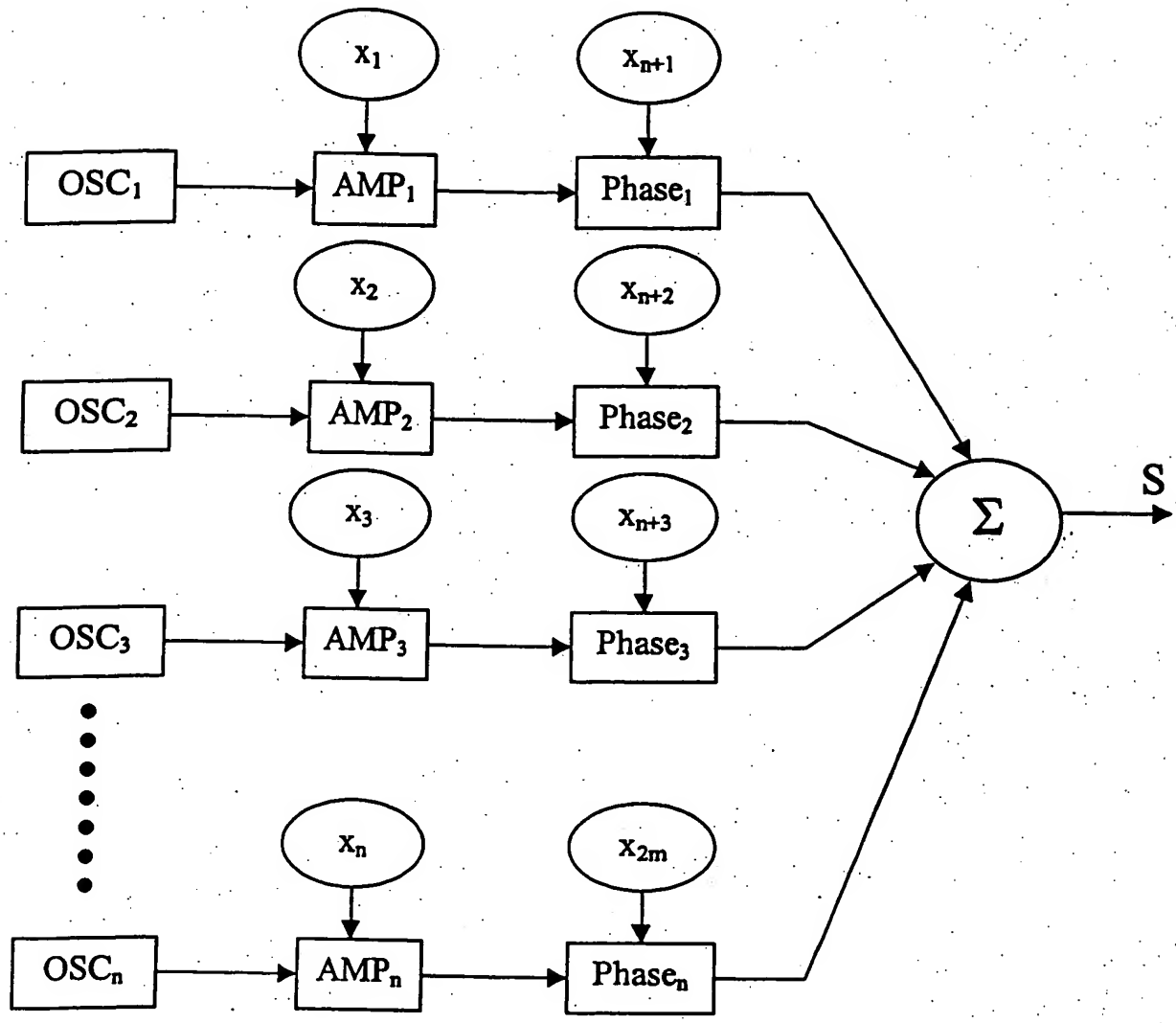

x1
xn+1
OSC1
AMP1
Phase1
x2
xn+2
OSC2
AMP2
Phase2
x3
xn+3
OSC3
AMP3
Phase3
xn
x2m
OSCn
AMPn
Phasen
Σ
S

FIG. 6

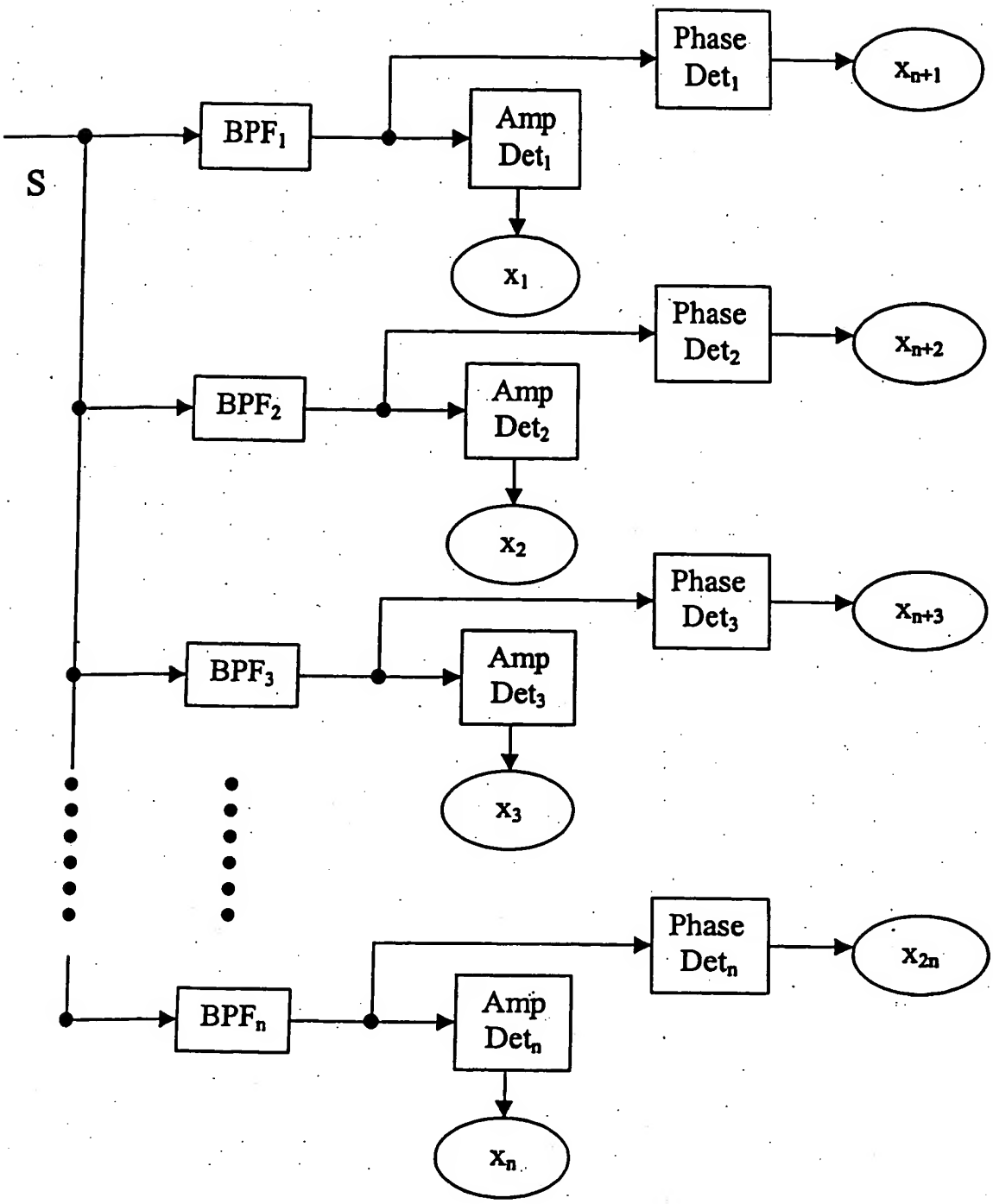

S
BPF1
Amp Det1
Phase Det1
xn+1
x1
BPF2
Amp Det2
Phase Det2
xn+2
x2
BPF3
Amp Det3
Phase Det3
xn+3
x3
BPFn
Amp Detn
Phase Detn
x2n
xn

FIG. 7

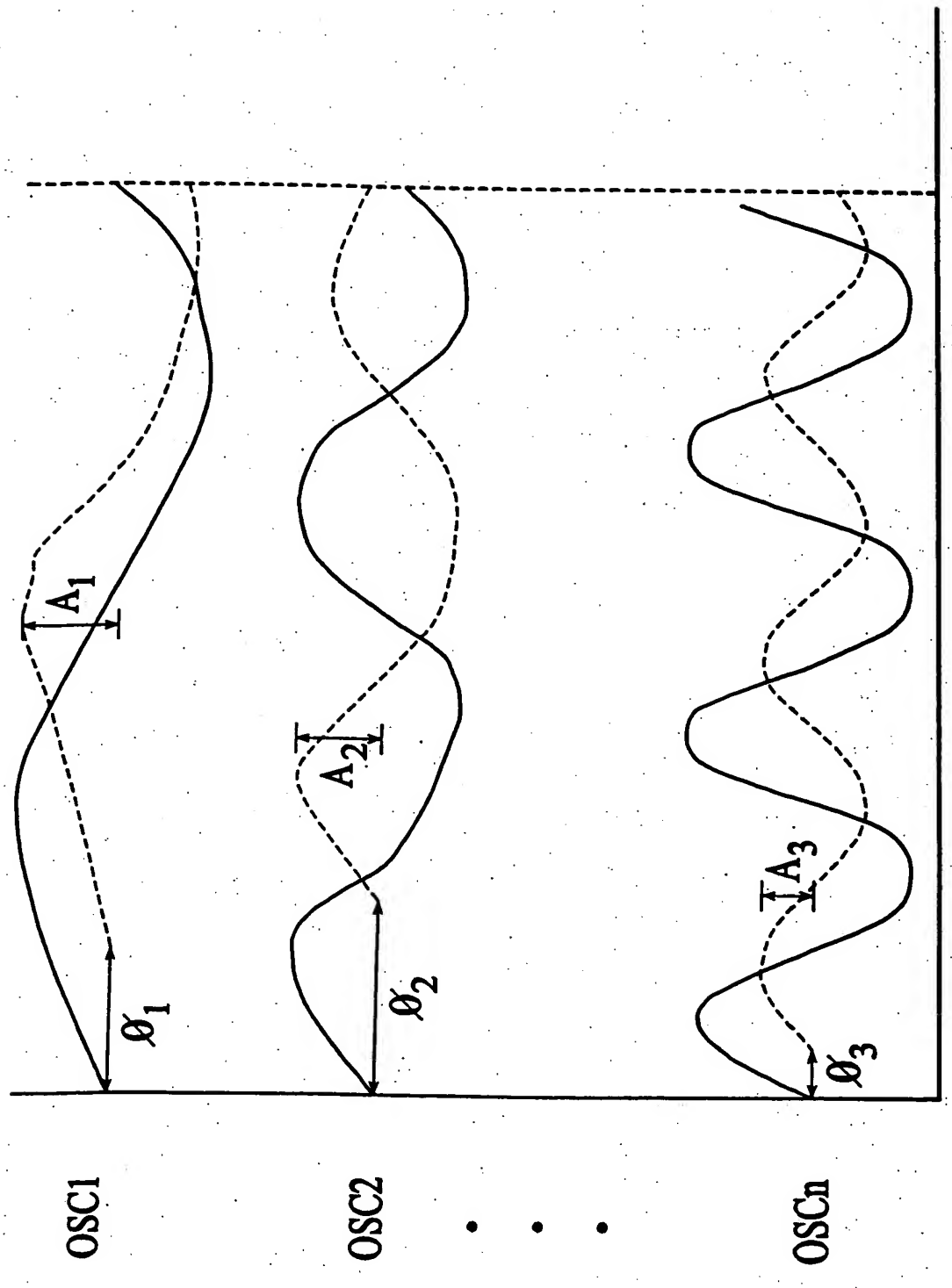


FIG. 8

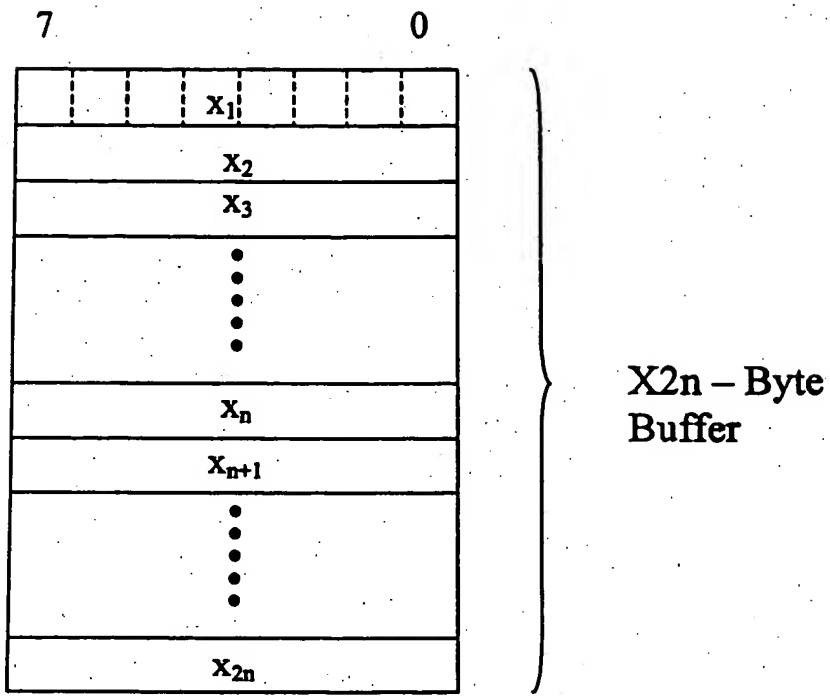
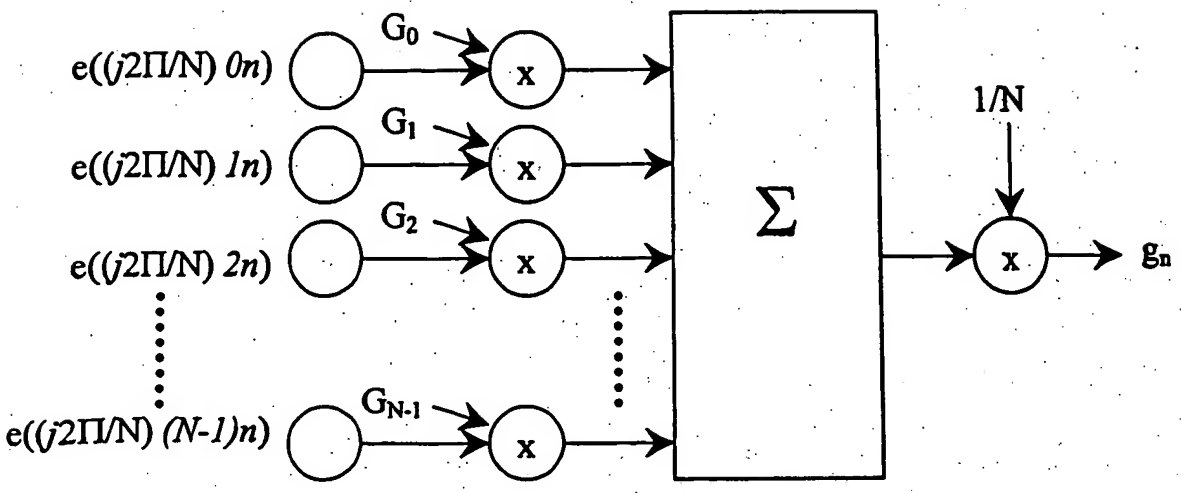
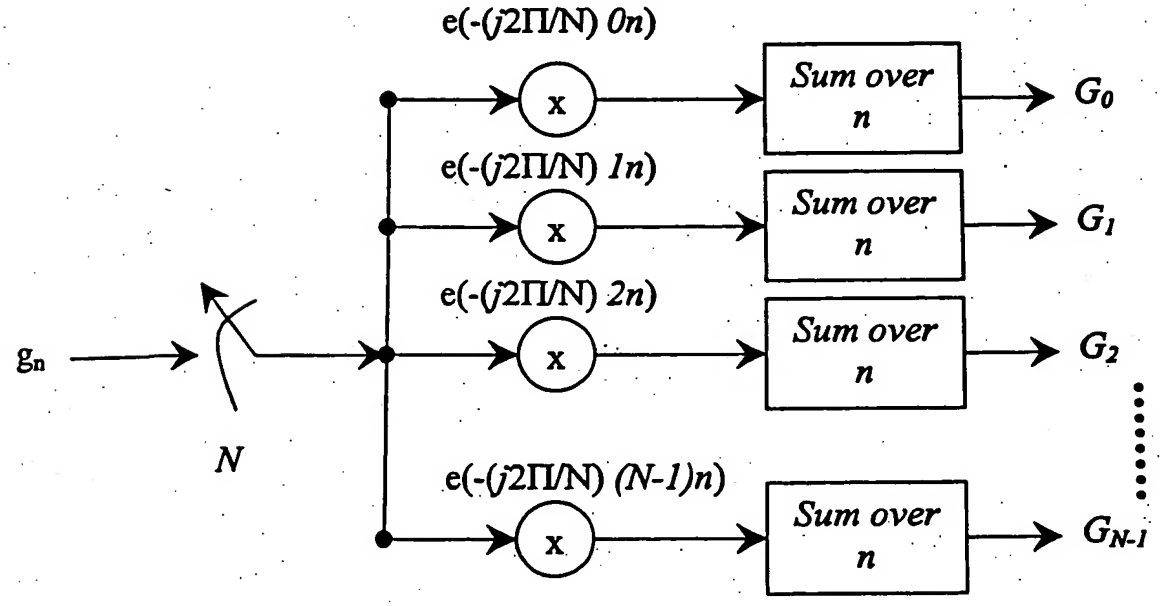


FIG. 9



The Inverse Discrete Fourier Transform



The Discrete Fourier Transform

FIG. 10

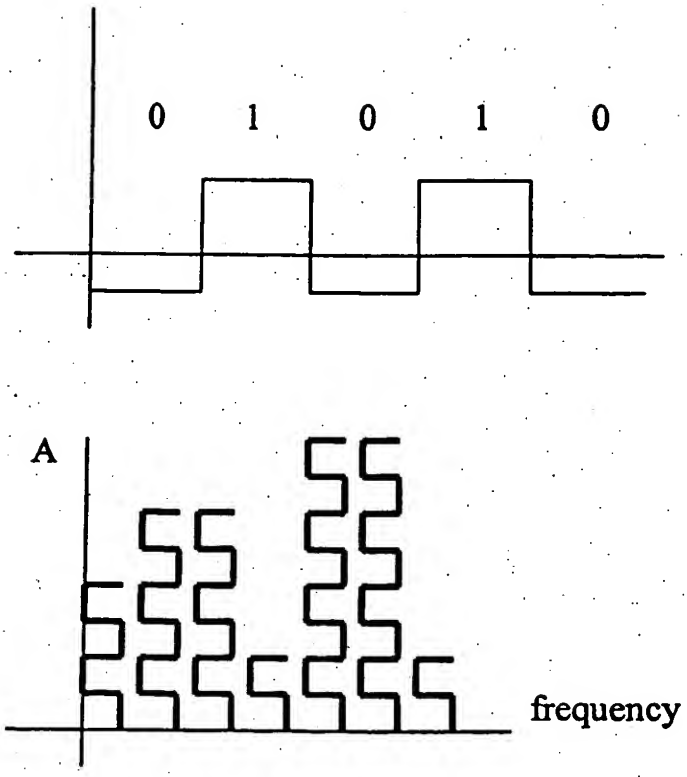

0
1
0
1
0
A
frequency

FIG. 11

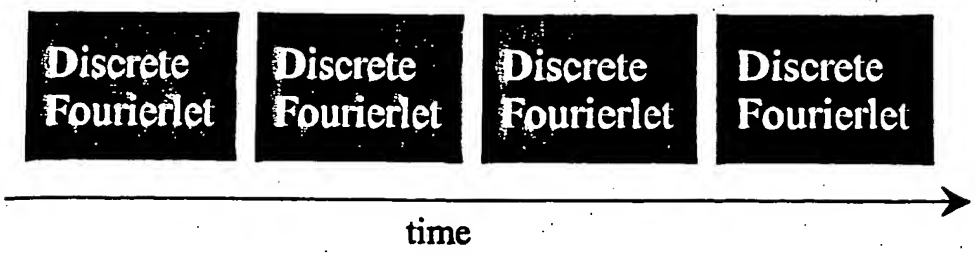

Discrete Fourierlet
Discrete Fourierlet
Discrete Fourierlet
Discrete Fourierlet
time

FIG. 12

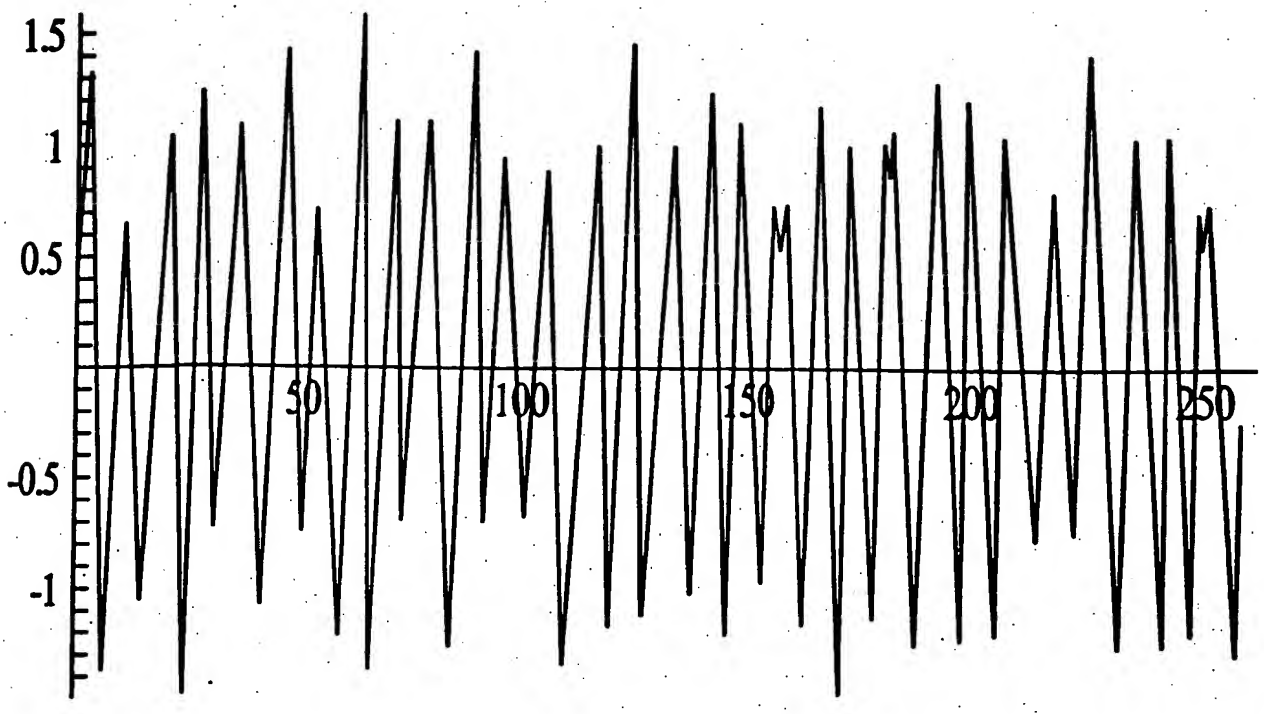


FIG. 13

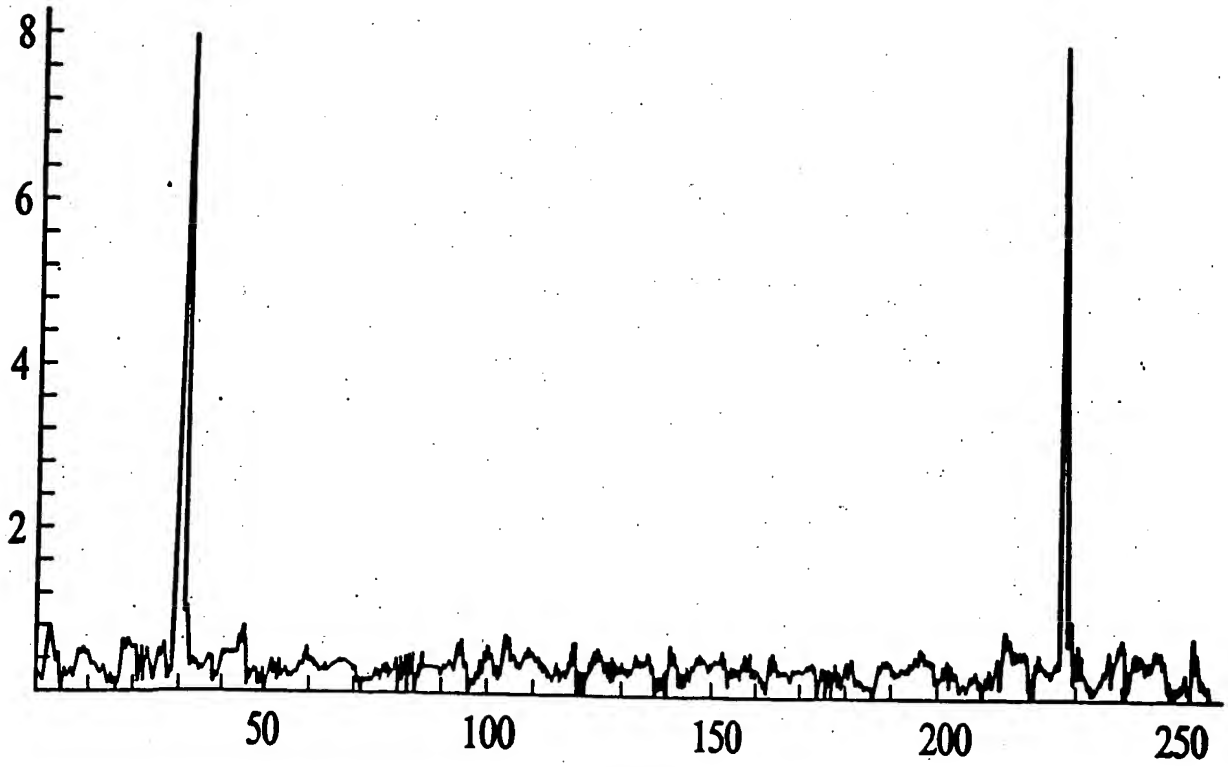


FIG. 14

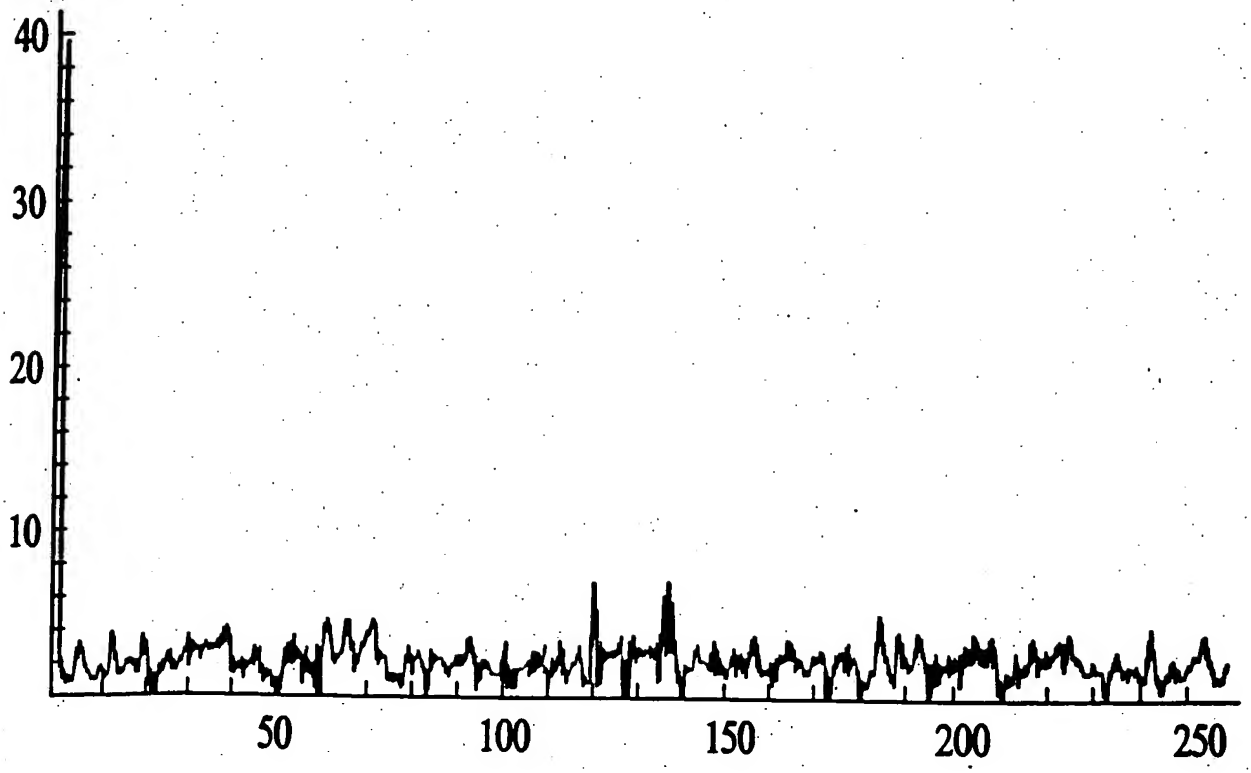


FIG. 15

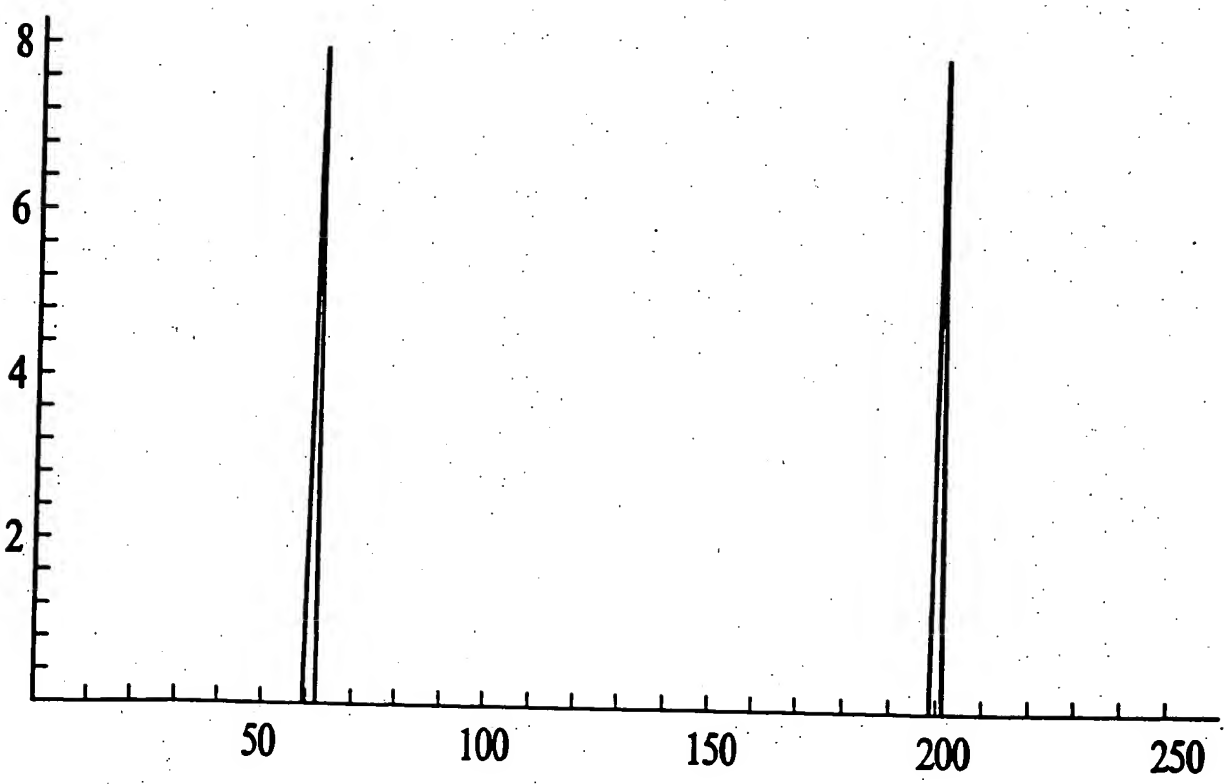
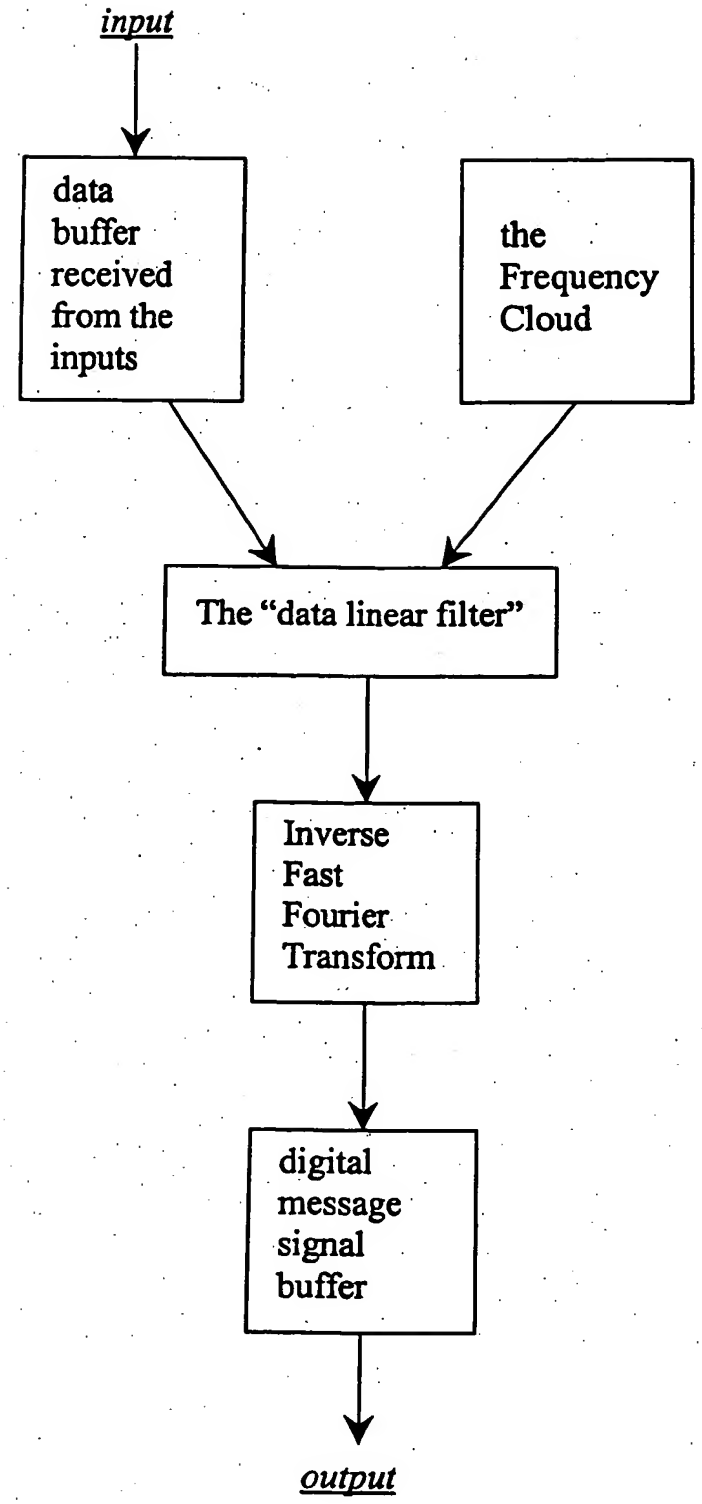
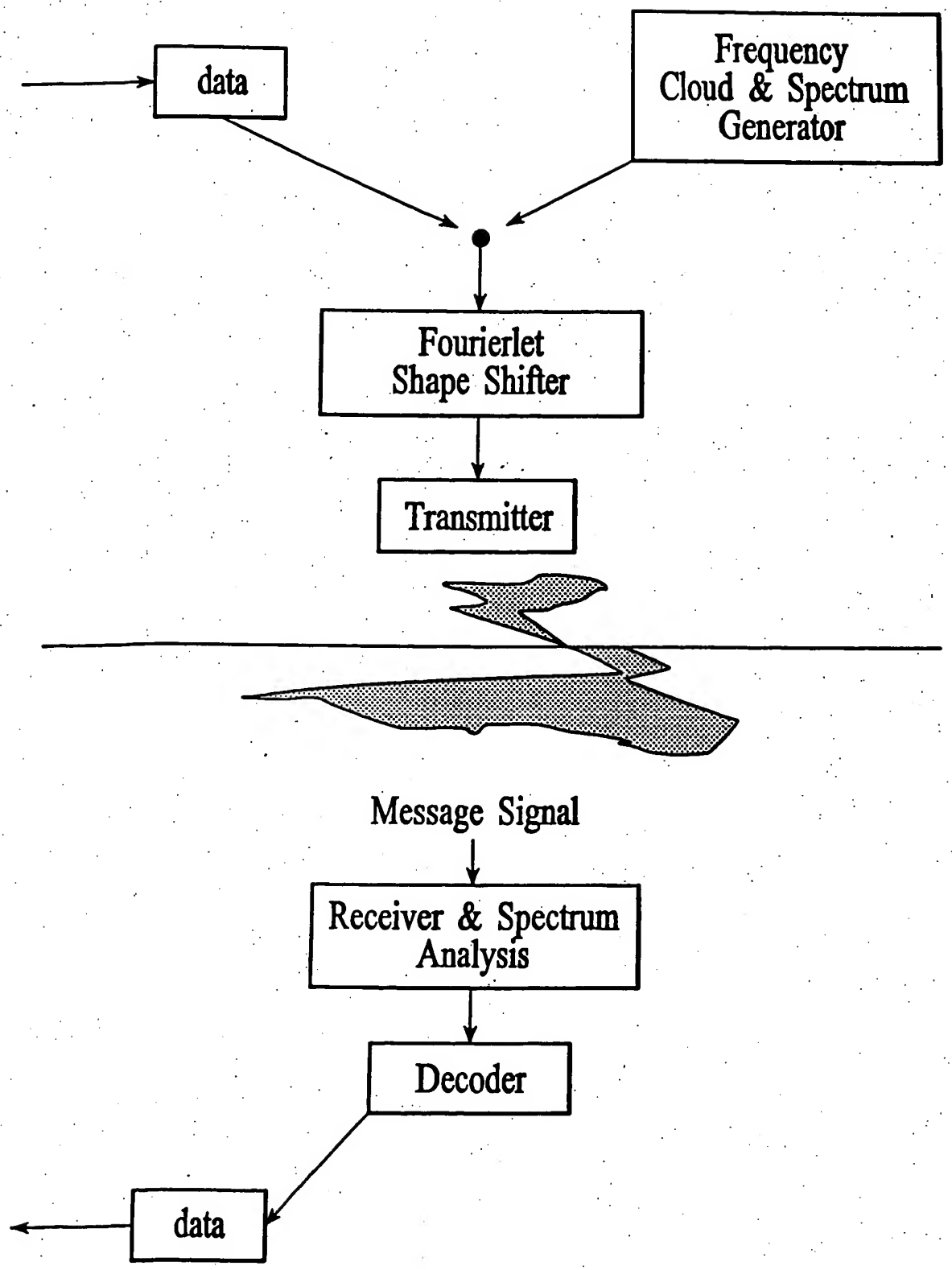


FIG. 16



The Fourierlet Shape Shifter

FIG. 17



The Fourierlet Shape Shifter in System Context.

FIG. 18

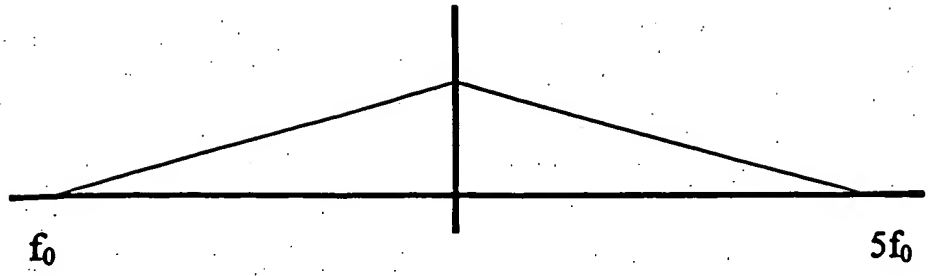


FIG. 19

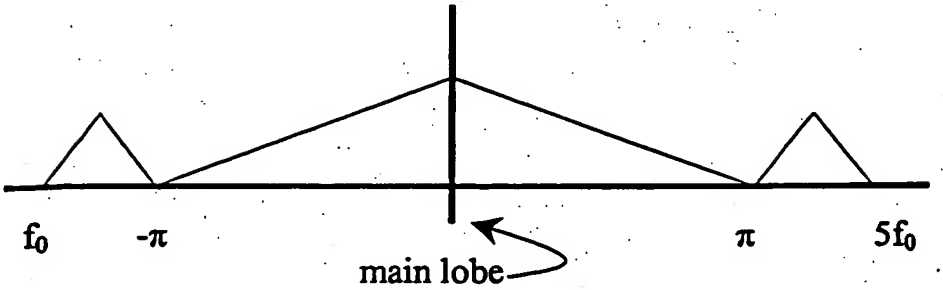


FIG. 22

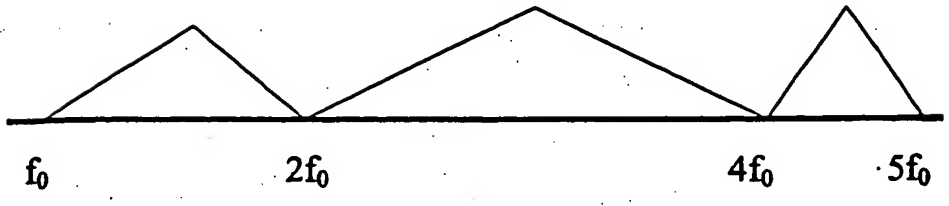


FIG. 23

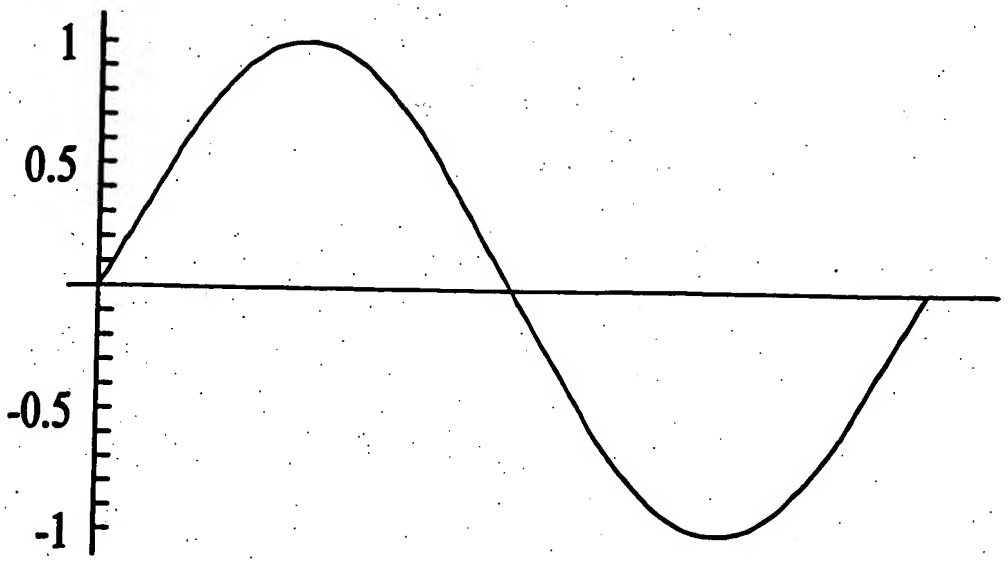


FIG. 20A

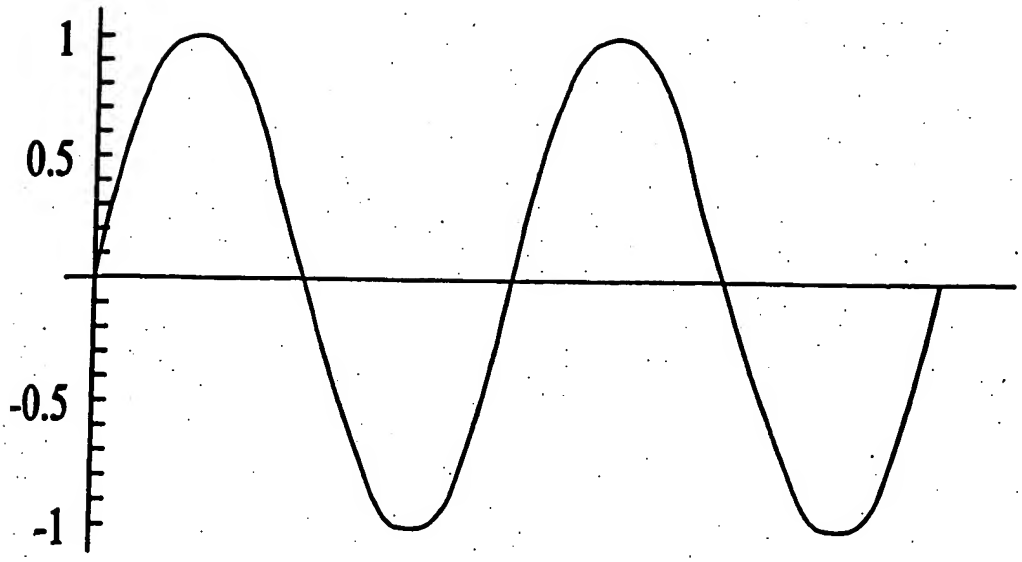


FIG. 20B

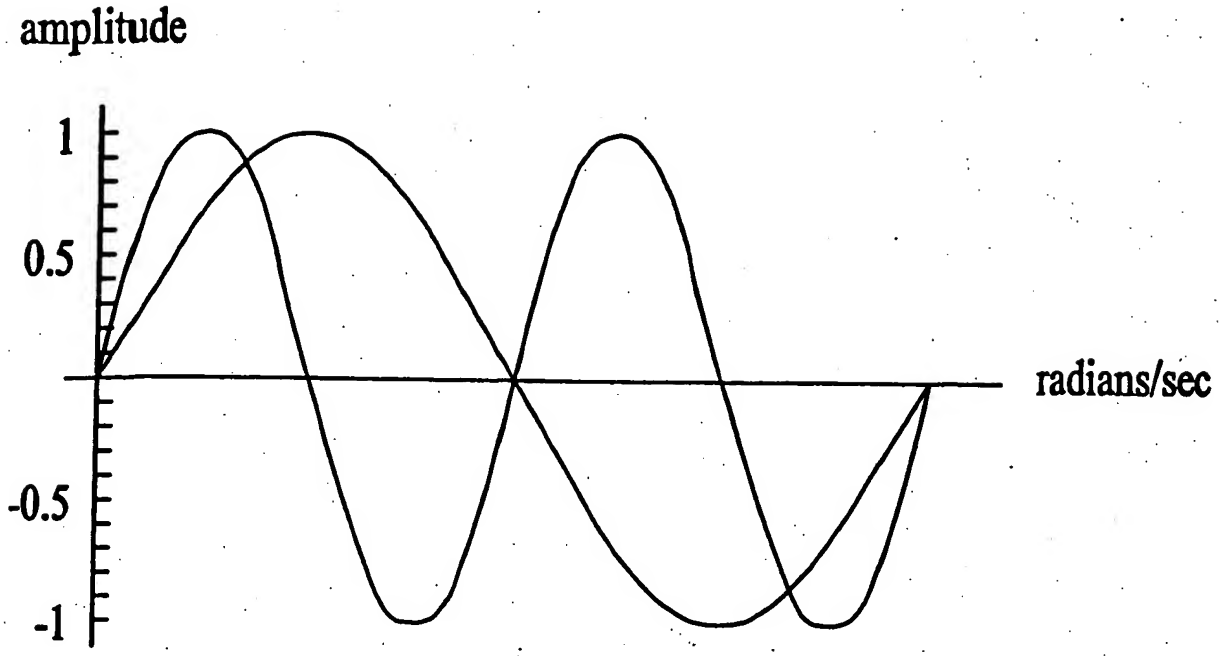


FIG. 20C

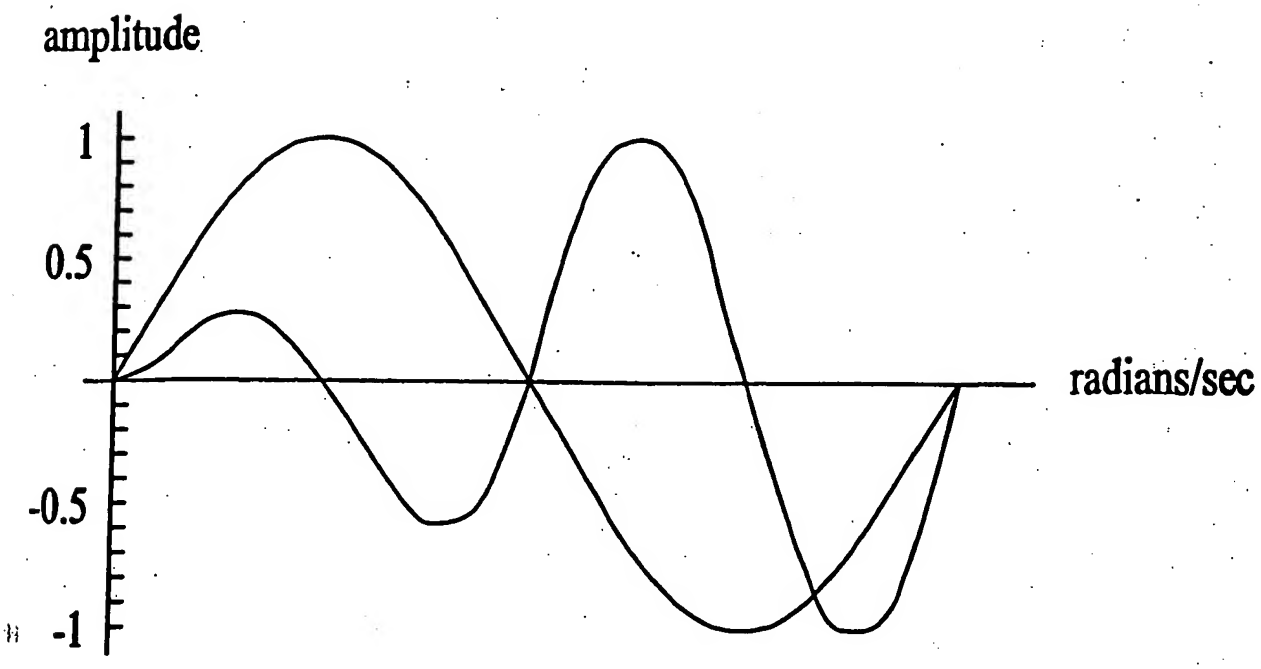


FIG. 21

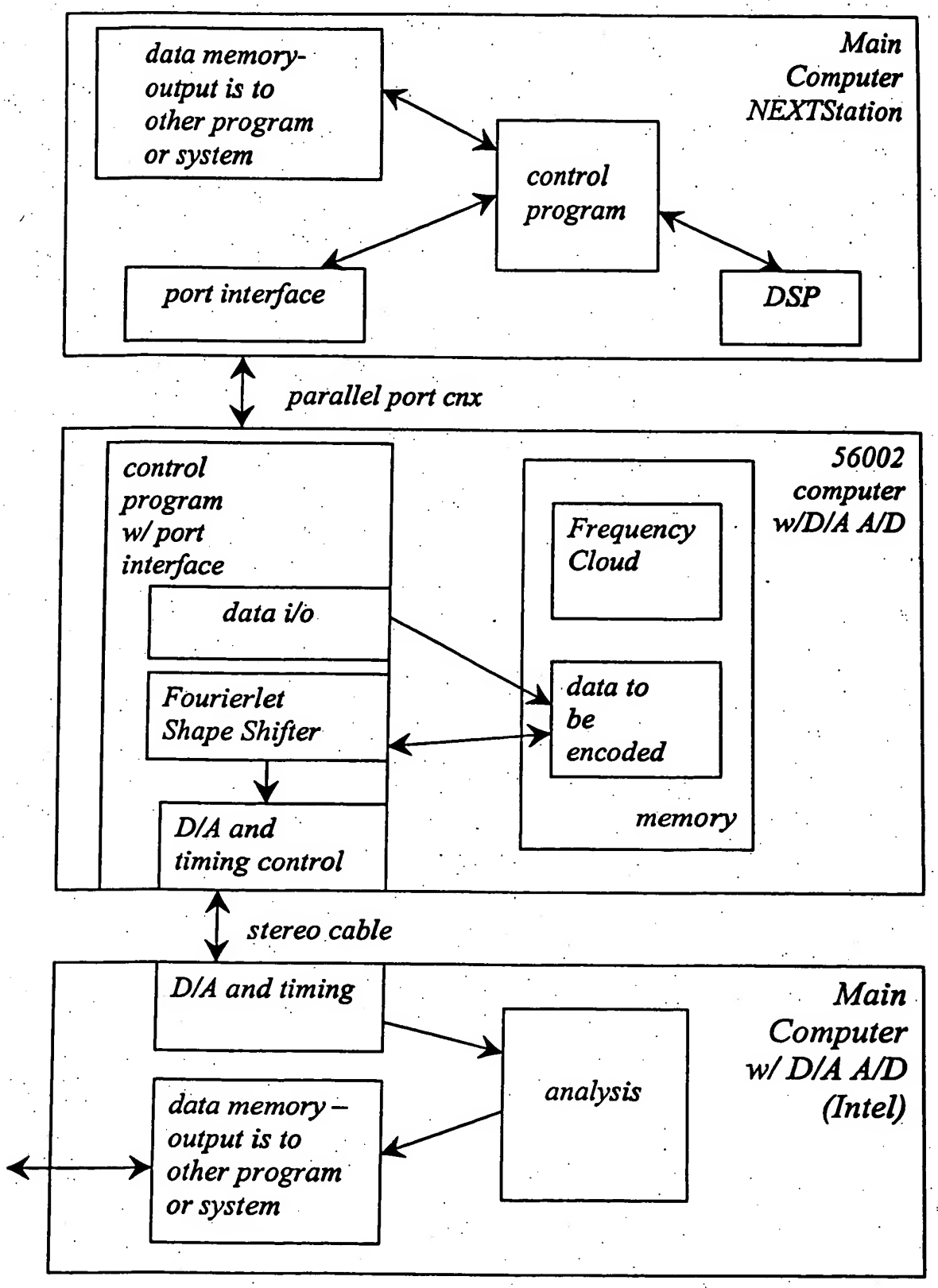

Main Computer NEXTStation
data memory-output is to other program or system
control program
port interface
DSP
parallel port cnx
56002 computer w/D/A A/D
control program w/ port interface
data i/o
Fourierlet Shape Shifter
D/A and timing control
Frequency Cloud
data to be encoded
memory
stereo cable
Main Computer w/ D/A A/D (Intel)
D/A and timing
analysis
data memory – output is to other program or system

FIG. 24

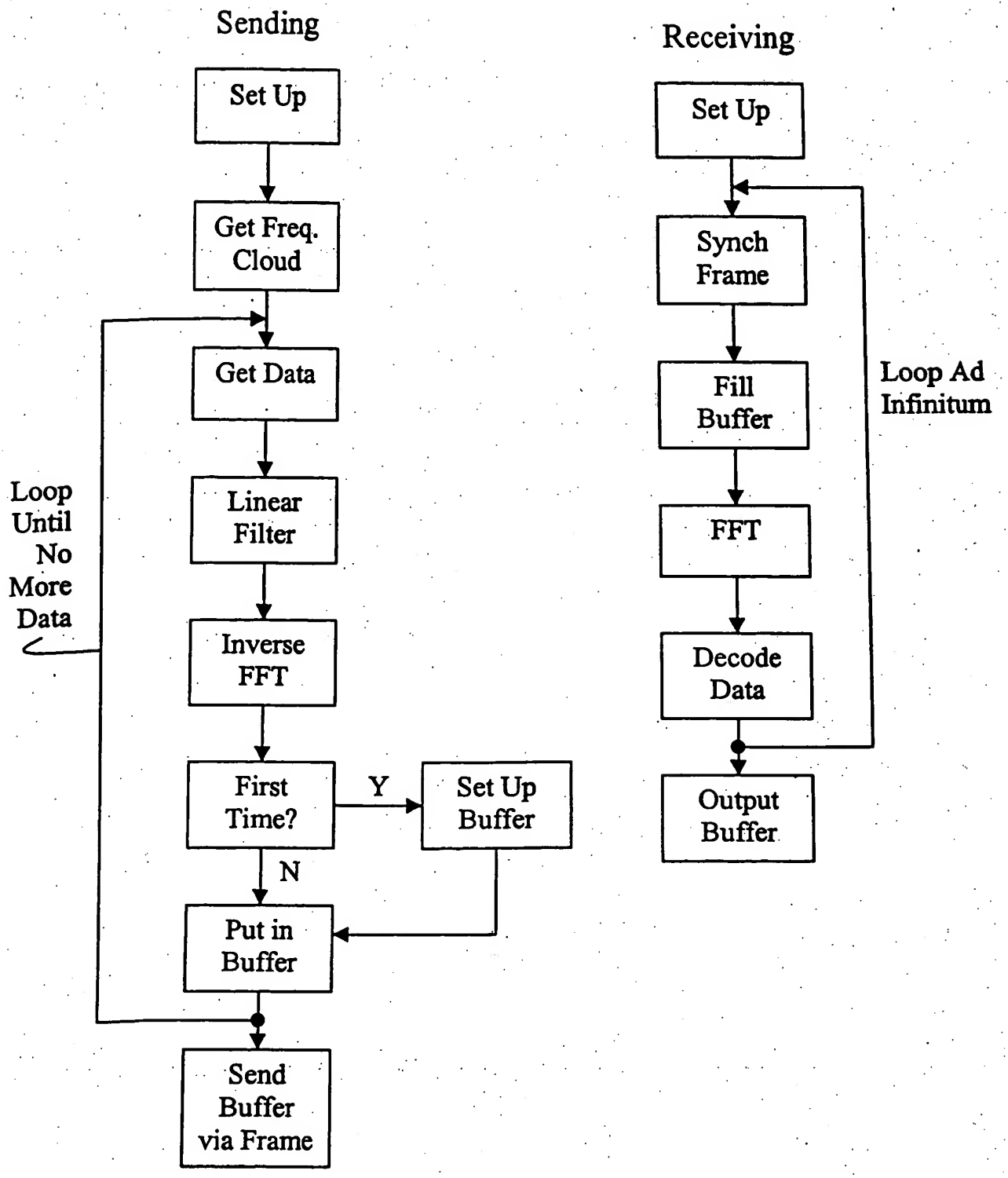

Sending
Set Up
Get Freq. Cloud
Get Data
Linear Filter
Inverse FFT
First Time?
Y
Set Up Buffer
N
Put in Buffer
Send Buffer via Frame
Loop Until No More Data
Receiving
Set Up
Synch Frame
Fill Buffer
FFT
Decode Data
Output Buffer
Loop Ad Infinitum

FIG. 25

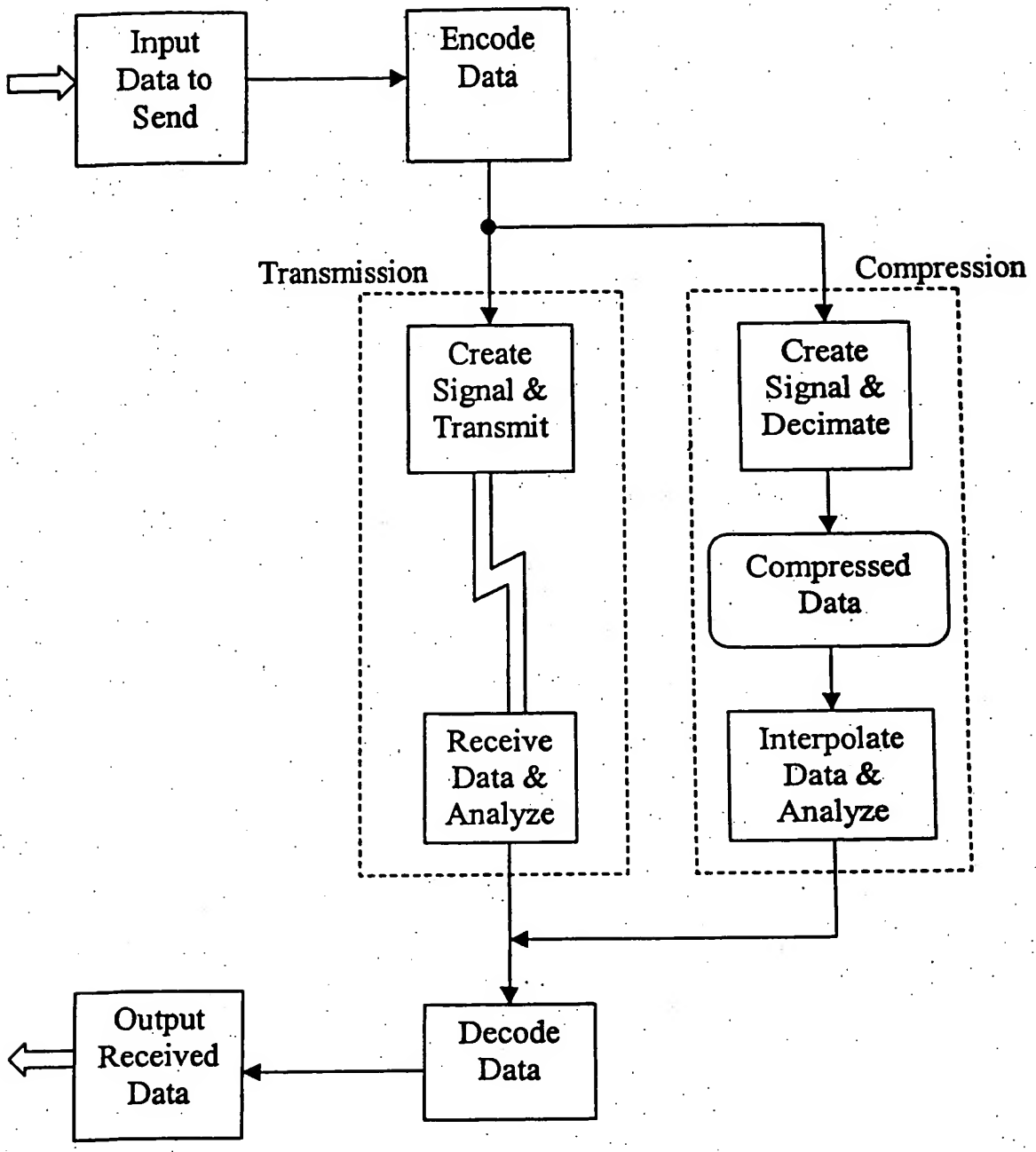

Input Data to Send
Encode Data
Transmission
Compression
Create Signal & Transmit
Create Signal & Decimate
Compressed Data
Receive Data & Analyze
Interpolate Data & Analyze
Output Received Data
Decode Data

FIG. 26

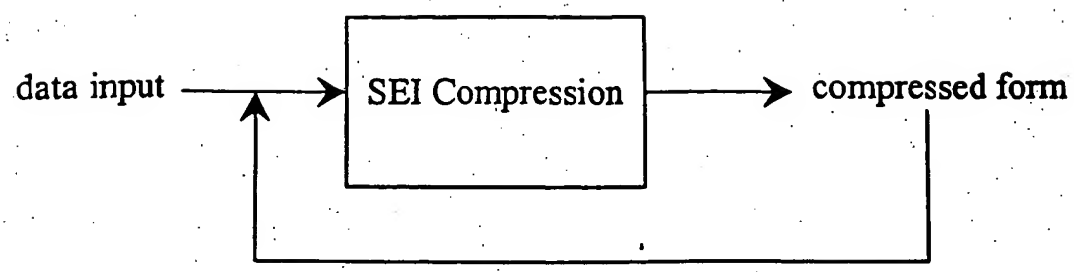

data input
SEI Compression
compressed form

FIG. 27

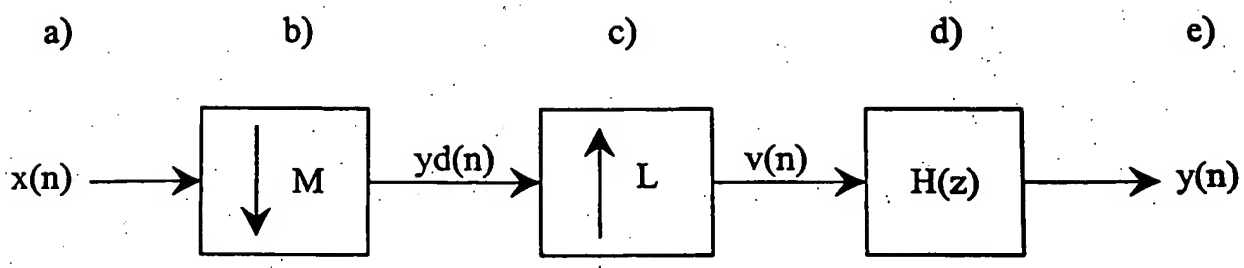

a)
b)
c)
d)
e)
x(n)
M
yd(n)
L
v(n)
H(z)
y(n)

FIG. 28

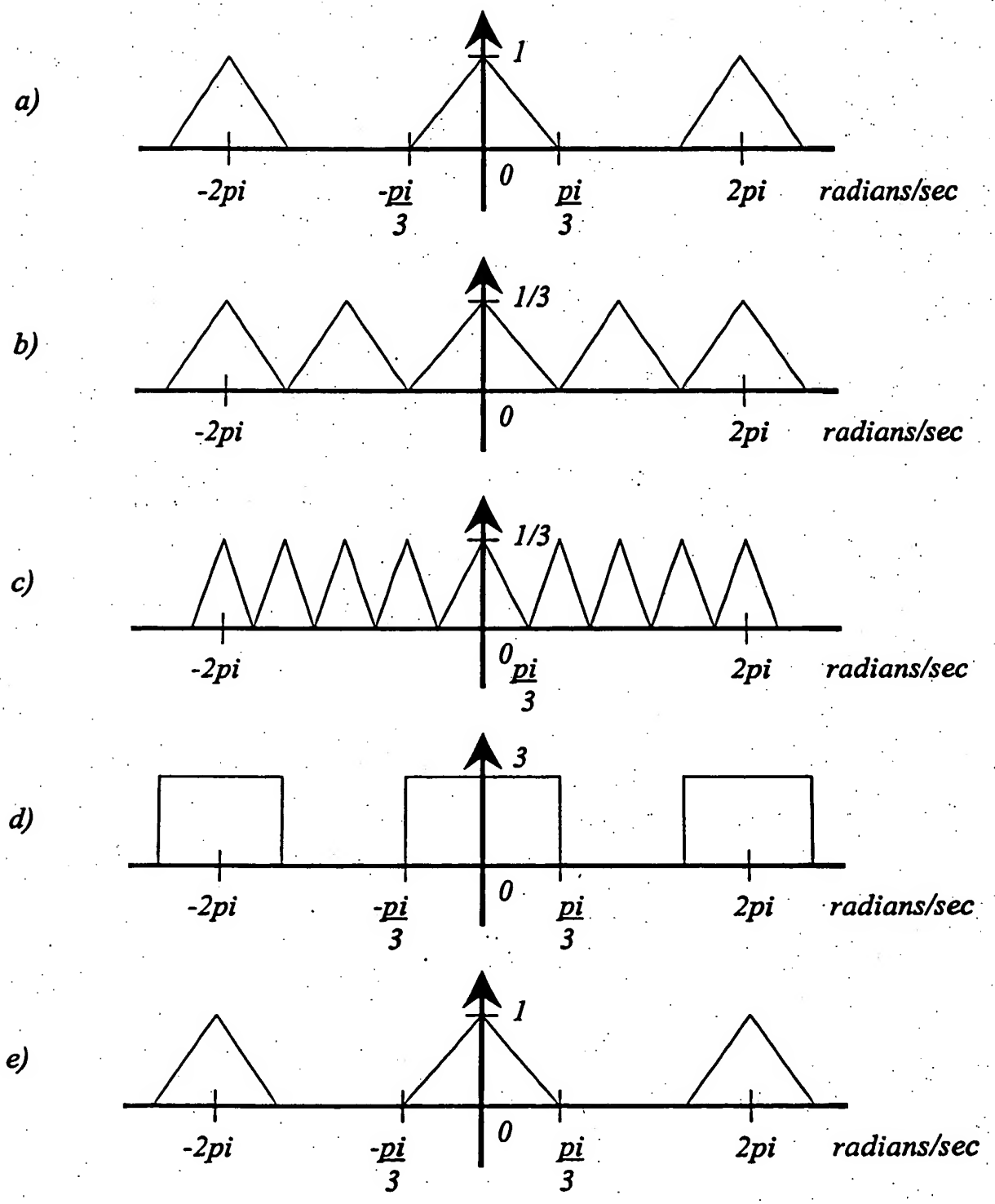

a)
1
-2pi
-pi/3
0
pi/3
2pi
radians/sec
b)
1/3
-2pi
0
2pi
radians/sec
c)
1/3
-2pi
0
pi/3
2pi
radians/sec
d)
3
-2pi
-pi/3
0
pi/3
2pi
radians/sec
e)
1
-2pi
-pi/3
0
pi/3
2pi
radians/sec

FIG. 29

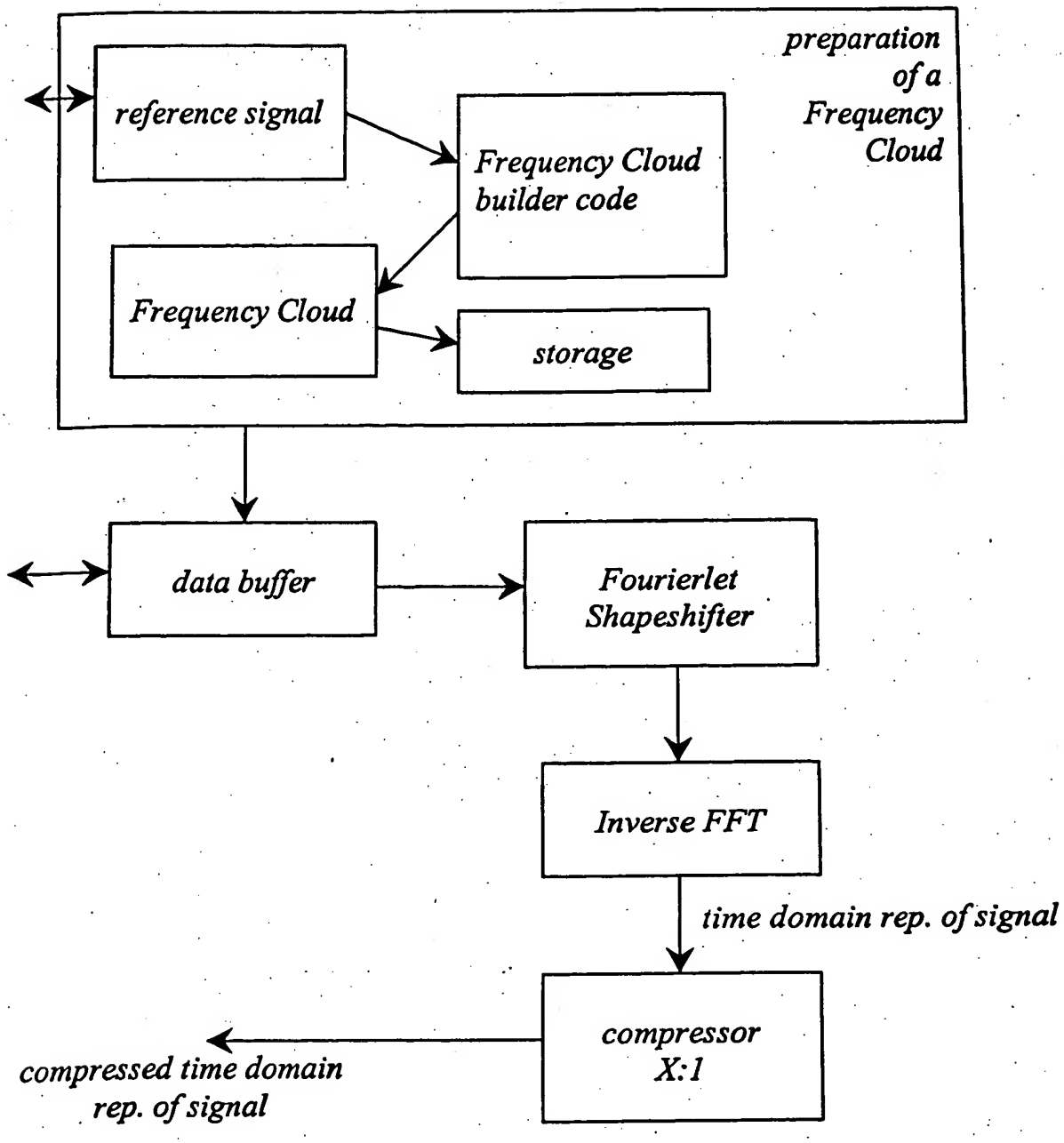

preparation of a Frequency Cloud
reference signal
Frequency Cloud builder code
Frequency Cloud
storage
data buffer
Fourierlet Shapeshifter
Inverse FFT
time domain rep. of signal
compressor X:1
compressed time domain rep. of signal

FIG. 30

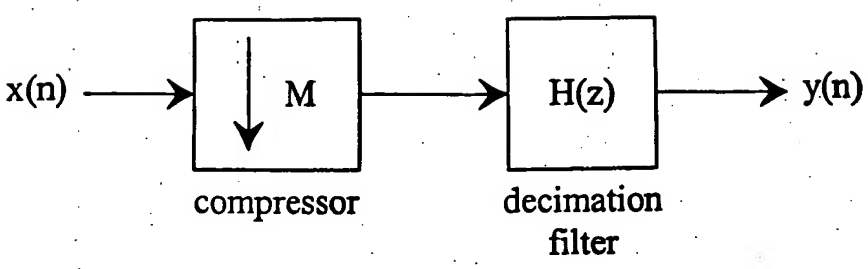


FIG. 31

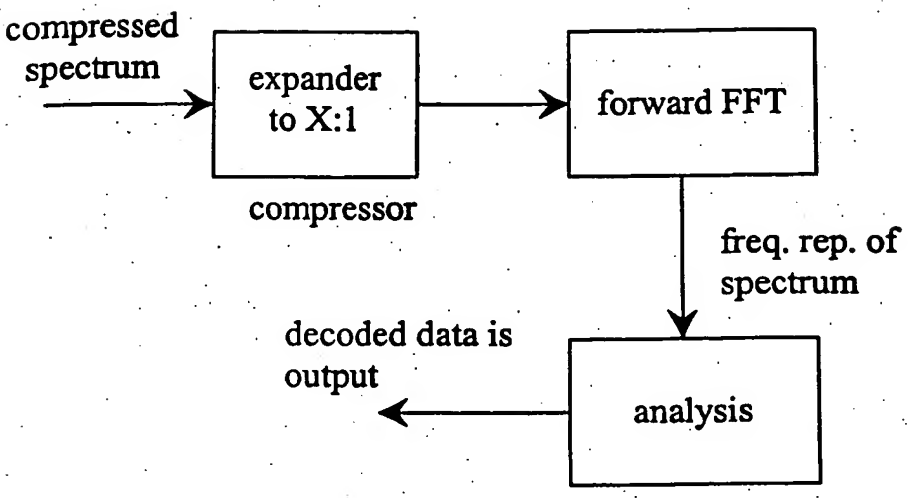


FIG. 32

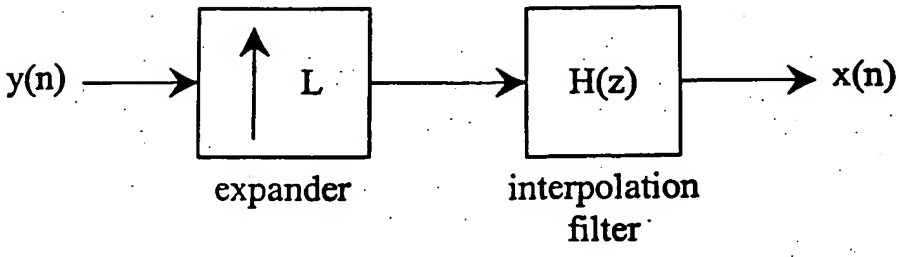


FIG. 33

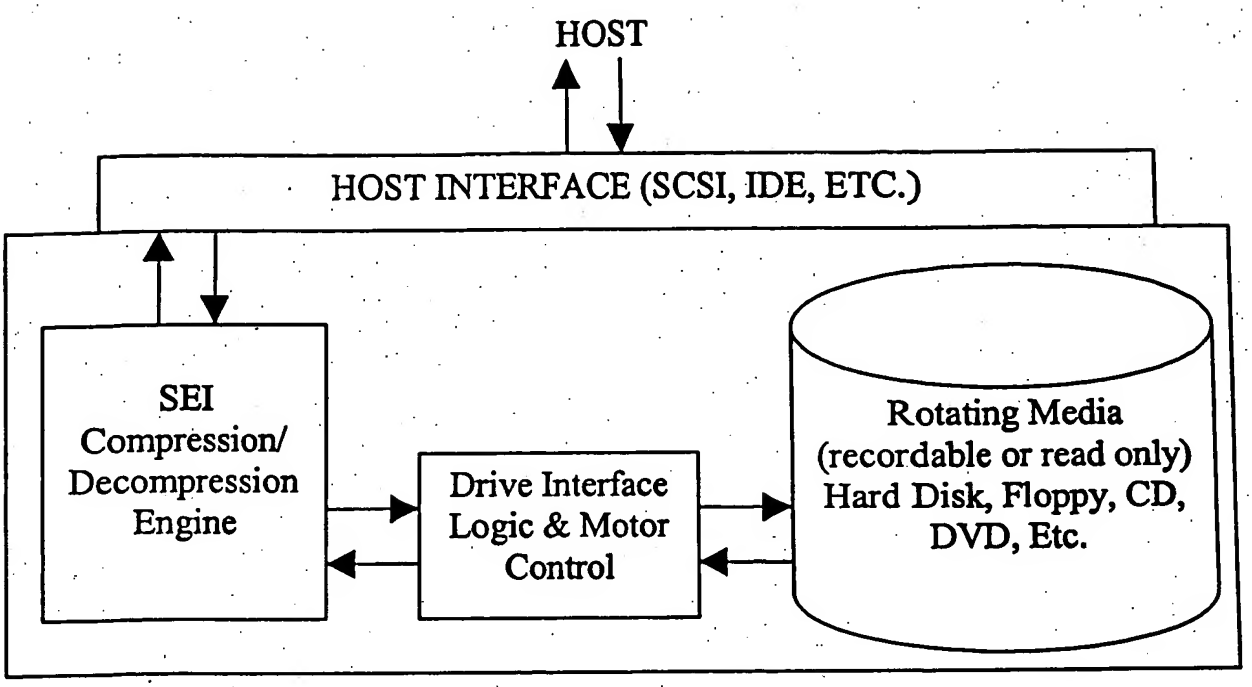

HOST
HOST INTERFACE (SCSI, IDE, ETC.)
SEI Compression/ Decompression Engine
Drive Interface Logic & Motor Control
Rotating Media (recordable or read only) Hard Disk, Floppy, CD, DVD, Etc.

FIG. 34

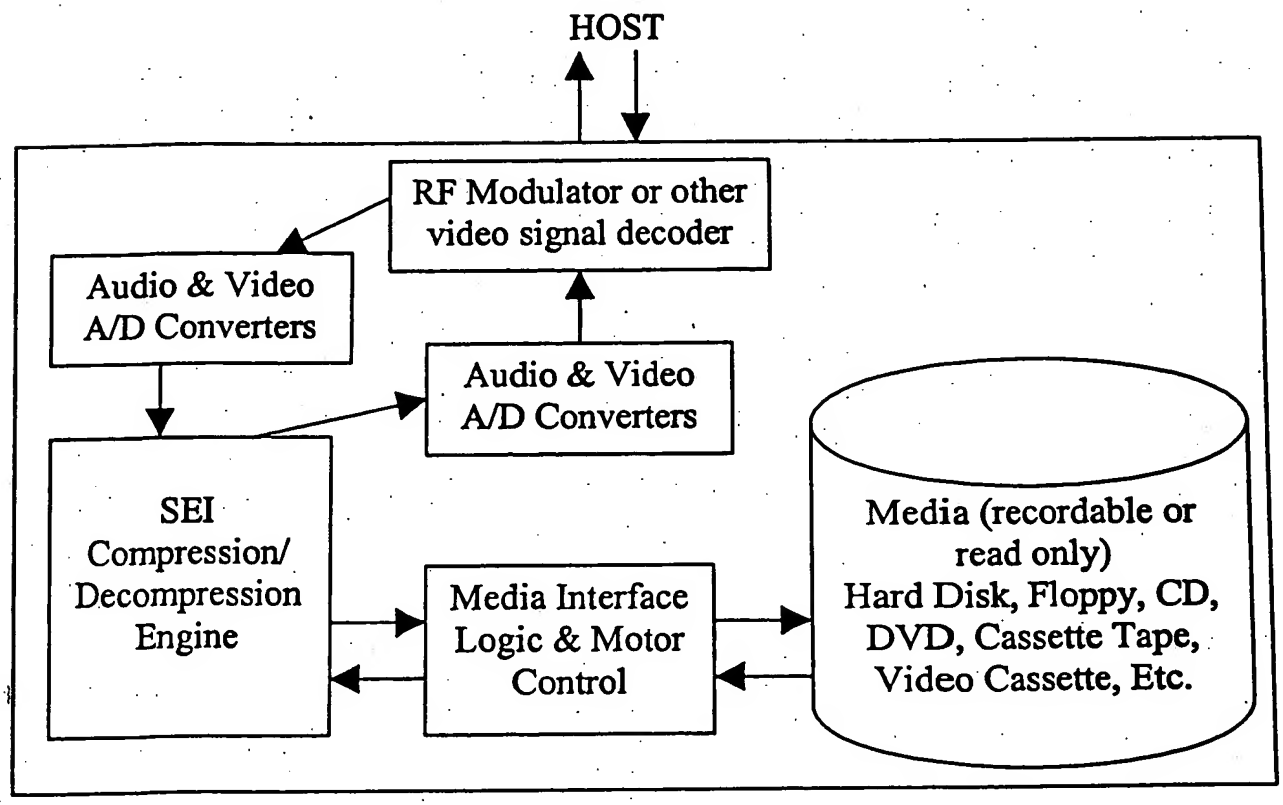

HOST
RF Modulator or other video signal decoder
Audio & Video A/D Converters
Audio & Video A/D Converters
SEI Compression/ Decompression Engine
Media Interface Logic & Motor Control
Media (recordable or read only) Hard Disk, Floppy, CD, DVD, Cassette Tape, Video Cassette, Etc.

FIG. 35

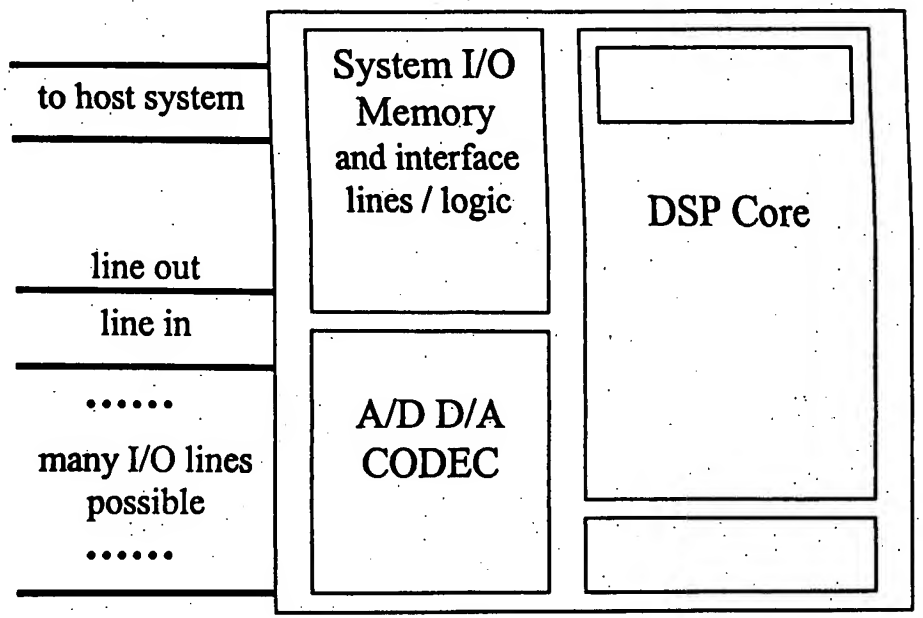

to host system
line out
line in
.....
many I/O lines possible
.....
System I/O Memory and interface lines / logic
A/D D/A CODEC
DSP Core

FIG. 36

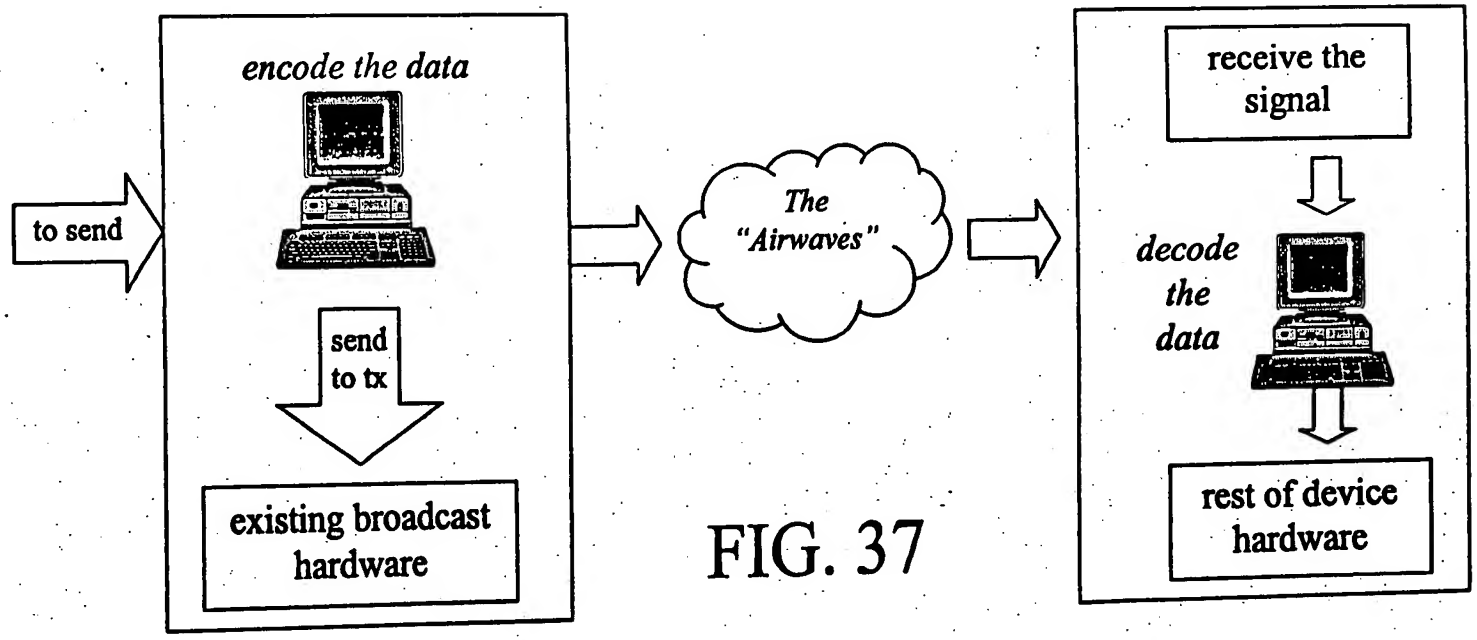

to send
encode the data
send to tx
existing broadcast hardware
The "Airwaves"
receive the signal
decode the data
rest of device hardware

FIG. 37

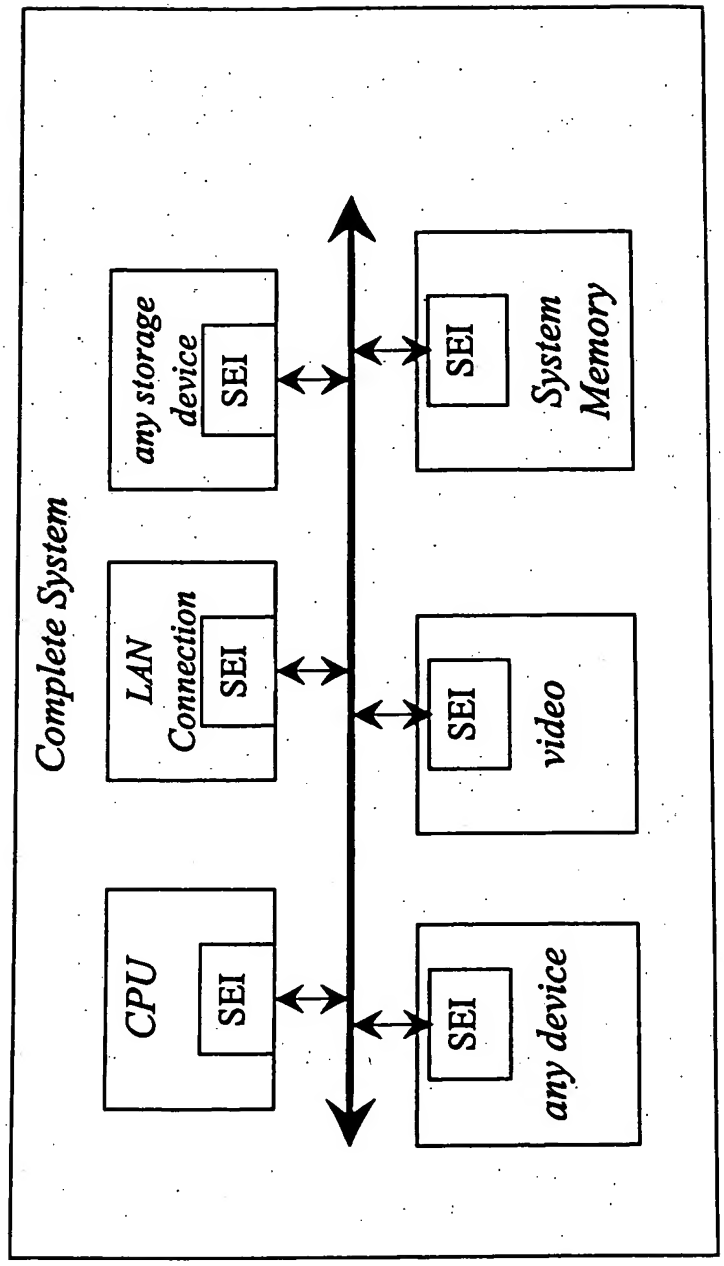

Complete System
CPU
SEI
LAN Connection
SEI
any storage device
SEI
SEI
any device
SEI
video
SEI
System Memory

FIG. 38